

## CLAIMS

1. A holographic multiplex recording method for  
multiplex-recording information as a hologram on a holographic  
5 recording medium using interference fringes of an object beam  
and a reference beam, into which a laser beam is split,  
wherein

in a process of multiplex-recording the information, a  
time of exposure to the laser beam per data page is kept  
10 constant, and a laser output power of the laser beam is  
increased in accordance with a decrease in recording  
sensitivity of the holographic recording medium.

2. A holographic multiplex recording method for  
multiplex-recording information as a hologram on a holographic  
15 recording medium using interference fringes of an object beam  
and a reference beam, into which a laser beam is split,  
wherein

in a process of multiplex-recording the information, a  
time of exposure to the laser beam per data page and a laser  
20 output power are kept constant, and a spatial light modulator  
having a plurality of pixels for intensity modulating of the  
object beam is used to increase the number of pixels of the  
spatial light modulator to be allocated to one bit of the  
information in accordance with a decrease in recording  
25 sensitivity of the holographic recording medium.

3. The holographic multiplex recording method according to claim 2, wherein an array of pixels of the spatial light modulator to be allocated to one bit of the information is formed in a square grid shape.

5        4. The holographic multiplex recording method according to claim 2 or 3, wherein, when a recording sensitivity of the holographic recording medium is reduced to less than or equal to  $1/N^2$  ( $N$  is an integer equal to two or greater) of an initial value of the recording sensitivity, the number of pixels of  
10 the spatial light modulator to be allocated to one bit of the information is increased to  $N^2$ .

5. A holographic recording apparatus for multiplex-recording information as a hologram on a holographic recording medium using interference fringes of an object beam and a  
15 reference beam, into which a laser beam is split, wherein

in a process of multiplex-recording the information, a time of exposure to the laser beam per data page is kept constant, and a laser output power of the laser beam can be increased in accordance with a decrease in recording  
20 sensitivity of the holographic recording medium.

6. A holographic recording apparatus for multiplex-recording information as a hologram on a holographic recording medium using interference fringes of an object beam and a reference beam, into which a laser beam is split,

25 includes a spatial light modulator having a plurality of

pixels for intensity modulating of the object beam, and

wherein

in a process of multiplex-recording the information, a time of exposure to the laser beam per data page and a laser output power are kept constant, and the number of pixels of the spatial light modulator to be allocated to one bit of the information is set to increase in accordance with a decrease in recording sensitivity of the holographic recording medium.

7. The holographic recording apparatus according to claim 6, wherein an array of pixels of the spatial light modulator to be allocated to one bit of the information is formed in a square grid shape.

8. The holographic recording method according to claim 6 or 7, wherein the number of pixels of the spatial light modulator to be allocated to one bit of the information is set to increase to  $N^2$  when a recording sensitivity of the holographic recording medium is reduced to less than or equal to  $1/N^2$  ( $N$  is an integer equal to two or greater) of an initial value of the recording sensitivity.

9. A holographic recording medium on which information is multiplex recorded as a hologram using interference fringes of an object beam and a reference beam, into which a laser beam is split, wherein

a time of exposure to the laser beam and a laser output power are kept constant, and a spatial light modulator having

a plurality of pixels for intensity modulation of the object beam is used to increase the number of pixels of the spatial light modulator to be allocated to one bit of the information in accordance with a decrease in recording sensitivity of the holographic recording medium, thereby allowing the information to be multiplex-recorded.

10. The holographic recording medium according to claim 9, wherein an array of pixels of the spatial light modulator to be allocated to one bit of the information is formed in a square grid shape, thereby allowing the information to be multiplex-recorded.

11. The holographic recording medium according to claim 9 or 10, wherein, when a recording sensitivity of the holographic recording medium is reduced to less than or equal to  $1/N^2$  ( $N$  is an integer equal to two or greater) of an initial value of the recording sensitivity, the number of pixels of the spatial light modulator to be allocated to one bit of the information is increased to  $N^2$ , thereby allowing the information to be multiplex-recorded.